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PROCEEDINGS

OF THE

PHYSICAL SOCIETY OF LONDON.

From December 1915 *to August* 1916.

VOL. XXVIII.

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PROCEEDINGS

AT THE

MEETINGS OF THE PHYSICAL SOCIETY

OF LONDON.

SESSION 1915–1916.

October 22, 1915.

Meeting held at Imperial College of Science.

Dr. A. Russell, M.A., Vice-President, in the Chair.

The following Papers were read :—

1. " The Radiation and Convection from a Heated Wire in an Enclosure of Air." By T. Barratt, A.R C.Sc., D.Sc.

2. " On the Determination, by the Method of Diffusive Convection, of the Coefficient of Diffusion of a Salt Dissolved in Water." By A. Griffiths, D.Sc.

3.* " The Magnitude of the Thermal Resistance Introduced at the Slightly Conical Junction of Two Solids and Its Variation with the Nature of the Surfaces in Contact." By T. Barratt, A.R.C.S., D.Sc.

* Taken as read.

November 12, 1915.

Meeting held at Imperial College of Science.

Dr. A. RUSSELL, M.A., Vice-President, in the Chair.

The following Paper was read :—

" The Effect of Electric Oscillations on the Magnetic Properties of Iron, Investigated by the Campograph." By Prof. J. A. FLEMING, M.A., D.Sc., F.R.S., and P. R. COURSEY, B.Sc.

The following Demonstrations were given by Mr. R. S. WHIPPLE:

1. A Hydraulic Analogy of a Wheatstone Bridge.
2. A Lecture Table Method of Obtaining Recalescence Curves.
3. The Leeds and Northrup Recorder.

November 26, 1915.

Meeting held at Imperial College of Science.

Dr. A. RUSSELL, M.A., Vice-President, in the Chair.

The following Papers were read :—

1. " On Obtaining and Maintaining a Bright Hydrogen Spectrum, with Special Reference to the 4,341 Line." By J. GUILD, A.R.C.S., D.I.C., F.R.A.S.

2. " Determination of the Coefficient of Diffusion of Potassium Chloride by an Analytical Method." By A. GRIFFITHS, D.Sc.

3. " Exhibition of Apparatus for Evaluating Elliptic Integrals." By A. F. RAVENSHEAR.

January 28, 1916.

Meeting held at Imperial College of Science.

Prof. Sir J. J. THOMSON, O.M., F.R.S., President, in the Chair.

The Second Guthrie Lecture was delivered by Mr. W. B. HARDY, M.A., Sec. R.S., on

" Some Properties of Living Matter."

Annual General Meeting.

February 11, 1916.

Meeting held at the Imperial College of Science.

Dr. A. Russell, M.A., Vice-President, in the Chair.

The Report of the Council was read by the Secretary.

In the year 1915 thirteen ordinary meetings have been held. The average attendance at the meetings was 37.

In response to the invitation circulated in July several Fellows sent suggestions to the President with respect to inventions which might be used or developed in connection with the war. The War Register forms which were circulated at the same time were returned duly completed by 185 Fellows. A classified list of these returns was made by the Admiralty Board of Invention and Research. The London County Council Education Office, acting on behalf of the Metropolitan Munitions Committee, made a classified list of the Fellows residing within the Metropolitan area who offered their services.

A complete classified Register of the returns has been made by a Committee of the Council with the co-operation of Mr. R. J. Sowter, a Fellow of the Society.

Copies of this Register are in the hands of the various Government Departments and the Council has reason to believe that they have been found useful.

The Second Guthrie Lecture, which was to have been delivered in October, had to be postponed owing to the illness of the lecturer (Mr. W. B. Hardy, F.R.S.).

The Annual Exhibition of Apparatus was again suspended owing to the war.

The number of Ordinary Fellows on the Roll on December 31, 1915, as distinct from Honorary Fellows, was 438. Eight new Fellows have been elected, and there have been seven resignations.

The Society has to mourn the loss of twelve Ordinary Fellows—namely, Prof. W. G. Adams and Sir Arthur Rücker (Past Presidents of the Society), Prof. F. R. Barrell, Dr. H. Debus, Capt. H. J. Dockrell, Prof. R. Meldola, Mr. H. G. J. Moseley (killed in action), Mr. F. H. Neville, Sir Andrew Noble, Sir Henry Roscoe, Prof. J. Shand and Mr. H. A. Taylor.

The Report was adopted by the meeting.

The Report of the Treasurer and the Balance-sheet were presented by the Treasurer.

The total income of the Society shows a decrease this year of about £54 when compared with last year. The most serious decrease is in the subscriptions. The annual subscriptions are £45 down, and there have been no Life Compositions during the year. The increase in the sales of publications is very satisfactory, and the gain under this head has practically wiped out the drop in the subscriptions.

The expenditure for the year has decreased by about £40. The decrease would have been greater if it had not been for the considerable increase (£71) in the cost of the "Proceedings," owing to the large number of pages that have been published during the year. It is also to be noted that last year there was additional expenditure due to a lecture and report.

The Society's income has exceeded its expenditure by £88. 4s. 5d., which shows that the Society, in spite of the present War conditions, is still sound financially.

The total assets show a decrease of about £90; this is caused by the depreciation in the value of the securities, based on the values on January 1st, 1916, which were kindly supplied by Messrs. Parr's Bank, Limited.

Arrears in the subscriptions have increased. The amount given in the Accounts is what is actually due to the Society, but I do not anticipate, under existing conditions, that we shall recover more than one-half the amount.

The liabilities on account of the Life Composition Fund are lower by £91. 10s., owing to the decease of seven Life Fellows.

The balance available in the General Fund is practically stationary.

The Report of the Treasurer was adopted.

The Treasurer in Account with the Physical Society, from January, 1915, to December 31st, 1915.

Dr.	£	s.	d.	£	s.	d.
Entrance Fees	7	7	0			
Subscriptions	495	13	3			
Extra Subscriptions	17	17	0			
Arrears	14	14	0			
Subscriptions paid in Advance	2	2	0			
Students' Subscriptions	3	13	6			
Subscriptions for "Science Abstracts" and Advance Proofs	13	14	6			
				555	1	3
Composition Fees				Nil.		
Dividends :—						
Furness Debenture Stock	14	8	6			
Midland Railway	35	16	8			
Metropolitan Board of Works	6	4	2			
Lancaster Corporation Stock	10	13	0			
New South Wales	7	17	6			
London, Brighton & South Coast Railway	21	10	10			
Great Eastern Railway	18	0	10			
India 3½% Stock	15	10	0			
				130	1	6
Interest on deposit account				9	9	5
Sales of Publications ("The Electrician" Printing & Publishing Co.)				163	2	0
				857	14	2
Transferred from Deposit Account				100	0	0
Balance at Bank, January 1, 1915	32	8	5			
Less Two Cheques	4	19	5			
				27	9	0
				£985	3	2

Cr.	£	s.	d.	£	s.	d.
"Science Abstracts"				281	16	6
Printing and Distributing Publications of the Society :—						
"The Electrician" Printing & Publishing Co.—						
"Proceedings"	301	13	7			
Bulletin	24	14	6			
Distribution	52	13	11			
General	37	4	1			
	416	6	1			
Less credit for use of type	2	2	8			
				414	3	5
Periodicals	1	15	0			
Reporting	35	0	0			
Refreshments and Attendance	9	12	3			
Petty cash	15	16	1			
Bank commission			10			
Royal Asiatic Society	2	2	0			
International Catalogue	5	16	2			
Hodgson, Mathematical Notation	1	5	6			
War Register	2	2	0			
				73	9	10
				769	9	9
To Deposit Account, April				100	0	0
Balance at Bank, January 1, 1916				115	13	5
				£985	3	2

WILLIAM DUDDELL, *Honorary Treasurer.*

January 21st, 1916.

Audited and found correct,

J. E. KINGSBURY.
J. W. CAPSTICK.

PROPERTY ACCOUNT OF THE PHYSICAL SOCIETY, DECEMBER 31ST, 1915.

ASSETS.	£	s.	d.
Subscriptions due, Treasurer's estimate...	40	8	6
£533 Furness Railway 3 per cent. Debenture Stock	370	0	0
£1,600 Midland Railway 2½ per cent. Preference Stock	924	0	0
£200 Metropolitan Board of Works 3½ per cent. Consolidated Stock	190	0	0
£400 Lancaster Corporation 3 per cent. Redeemable Stock	306	0	0
£254. 2s. 9d. New South Wales 3½ per cent. Debenture Stock	230	0	0
£500 London, Brighton & South Coast Railway Ordinary Stock	368	0	0
£500 Great Eastern Railway 4 per cent. Debenture Inscribed Stock.....	475	0	0
£500 India 3½ per cent Stock	404	0	0
Balance at Bank	115	13	5
Ditto on deposit.....	300	0	0
Publications (Treasurer's Estimate).....	220	0	0
	£3,943	1	11

LIABILITIES.	£	s.	d
Life Compositions	2,010	10	0
Balance General Fund.....	1,932	11	11
	£3,943	1	11

WILLIAM DUDDELL, *Honorary Treasurer.*

Audited and found correct,

J. E. KINGSBURY.
J. W. CAPSTICK.

January 21st, 1916.

LIFE COMPOSITION FUND.

	£	*s.*	*d.*
164 Fellows paid £10	1,640	0	0
3 Fellows paid £15	45	0	0
5 Fellows paid £21	105	0	0
7 Fellows paid £31. 10s.	220	10	0
	£2,010	10	0

NOTE.—Two Fellows who paid £10 deceased during year 1914 (not deducted in last account).

Four Fellows who paid £10 deceased during year 1915.

One Fellow who paid £31 10s., deceased during year 1915.

Audited and found correct,

WILLIAM DUDDELL, *Honorary Treasurer.*

January 21st, 1916.

J. E. KINGSBURY.
J. W. CAPSTICK.

The Election of Officers and Council then took place, the new Council being constituted as follows :—

President.—Prof. C. VERNON BOYS, F.R.S.

Vice-Presidents, who have filled the Office of President.—Prof. G. C. FOSTER, D.Sc., LL.D., F.R.S. ; Prof. R. B. CLIFTON, M.A., F.R.S. ; Prof. A. W. REINOLD, C.B., M.A., F.R.S. ; Sir W. DE W. ABNEY, R.E., K.C.B., D.C.L., F.R.S. ; Prin. Sir OLIVER J. LODGE, D.Sc., LL.D., F.R.S. ; Prof. SILVANUS P. THOMPSON, D.Sc., F.R.S. ; R. T. GLAZEBROOK, C.B., D.Sc., F.R.S. ; Prof. J. PERRY, D.Sc., F.R.S. ; C. CHREE, Sc.D., LL.D., F.R.S. ; Prof. H. L. CALLENDAR, M.A., LL.D., F.R.S. ; Prof. A. SCHUSTER, Ph.D., Sc.D., F.R.S. ; Sir J. J. THOMSON, O.M., D.Sc., F.R.S.

Vice-Presidents.—W. R. COOPER, M.A., B.Sc. ; F. E. SMITH ; S. W. J. SMITH, M.A., D.Sc., F.R.S. ; W. E. SUMPNER, D.Sc.

Secretaries.—W. ECCLES, D.Sc. ; R. S. WILLOWS, M.A., D.Sc.

Foreign Secretary.—R. T. GLAZEBROOK, C.B., D.Sc., F.R.S.

Treasurer.—W. DUDDELL, F.R.S.

Librarian.—S. W. J. SMITH, M.A., D.Sc., F.R.S.

Other Members of Council.—H. S. ALLEN, M.A., D.Sc. ; Prof. W. H. BRAGG, M.A., F.R.S. ; S. D. CHALMERS, M.A. ; Prof. G. W. O. HOWE, D.Sc. ; Prof. J. W. NICHOLSON, M.A., D.Sc. ; C. C. PATERSON ; C. E. S. PHILLIPS, F.R.S.E. ; Prof. O. W. RICHARDSON, M.A., D.Sc., F.R.S. ; G. F. C. SEARLE, Sc.D., F.R.S. ; F. J. W. WHIPPLE, M.A.

After the conclusion of the General Business, the Chair was taken by Prof. C. V. BOYS and the following Papers were read :—

1. " On a General Bridge Method for Comparing the Mutual Inductance between Two Coils with the Self Inductance of One of Them." By Prof. C. H. LEES, F.R.S.

2. " An Enclosed Cadmium Vapour Arc Lamp." By H. J. S. SAND, D.Sc.

Two Slides were shown by Dr. SYDNEY RUSS showing the Ultra-violet Spectrum of the Simpson Arc, compared with that of Tungsten.

March 10, 1916.

Meeting held at Imperial College of Science.

Prof. C. V. Boys, F.R.S., President, in the Chair.

The following Papers were read :—

1. " Experiments Illustrating the Flow of Heat in Conducting Sheets." By S. Skinner, M.A.
2. " The Absorption of Gases by Quartz Vacuum Tubes." By R. S. Willows, M.A., D.Sc., and H. Trevelyan George, M.A.

March 24, 1916.

Meeting held at the Imperial College of Science.

Mr. F. E. Smith, A.R.C.S., Vice-President, in the Chair.

The following Papers were read :—

1. " A New Method of Determining Ionic Velocities." By Mrs. C. H. Griffiths, B.Sc.
2. " Note on an Explanation of the Migration of the Ions." By S. W. J. Smith, D.Sc., F.R.S.
3.* " A Method of Exhibiting the Velocity of Iodine Ions in Solution." By S. W. J. Smith, D.Sc. F.R.S.

* Taken as read.

May 12, 1916.

Meeting held at Imperial College of Science.

Prof. C. V. Boys, F.R.S., President, in the Chair.

The following Papers were read :—

1. " The Latent Heat of Fusion of Metals and the Quantum-Theory." By Dr. H. S. Allen, M.A.
2. " Lenses for Light Distribution." By T. Smith, B.A.
3. " The Choice of Glass for Cemented Objectives." By T. Smith, B.A.

May 26, 1916.

Meeting held at Imperial College of Science.

Prof. C. V. Boys, F.R.S., President, in the Chair.

The following Papers were read :—

1. "The Correction of Chromatic Aberrations when the External Media are Dispersive." By T. Smith, B.A.
2. "Note on the Use of the Auto-Collimating Telescope in the Measurement of Angles." By J. Guild, F.R.A.S.
3. "The Viscosity of Colloidal Solutions." By E. Hatschek.

June 16, 1916.

Meeting held at Imperial College of Science.

Prof. G. W. O. Howe, D.Sc., in the Chair.

The following Papers were read :— :

1. "Experiments with Mercury Jet Interruptors." By Capt. C. E. S. Phillips, F.R.S.E.
2. "A Method of Measuring the Pressure of Light by Means of Thin Metal Foil." Part II. By G. D. West, B.Sc.
3. "The Viscosity of Suspensions of Rigid Particles at Different Rates of Shear." By Edith Humphrey, B.Sc., Ph.D., and Emil Hatschek.
4.* "A Correction of Some Work on Diffusion by Dr. A. Griffiths and Others." By A. Griffiths, D.Sc.

* Taken as read.

June 30, 1916.

Meeting held at Imperial College of Science.

Prof. C. V. Boys, F.R.S., President, in the Chair.

The following Papers were read :—

1. "A Sensitive Magnetometer." By P. E. Shaw, D.Sc., and C. Hayes, B.Sc.
2. "The Latent Heat of Fusion of a Metal and the Quantum-Theory." By H. S. Allen, D.Sc.
3.* "Cohesion." Part II. By Prof. H. Chatley.

Some Experiments on the Thermo-electric Properties of Fused Metals were shown by Chas. R. Darling, A.R.C.S.

* Taken as read.